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**RESEARCH ARTICLE** 

# **RETROPERITONEAL LAPAROSCOPIC URETEROLITHOTOMY AND URETEROSCOPIC PNEUMATIC LITHOTRIPSY IN THE MANAGEMENT OF LARGE IMPACTED UPPER URETERIC STONES – A COMPARATIVE STUDY**

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### **Manuscript Info**

#### Abstract

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#### Key words:

 RPUL-Retroperitoneal

 ureterolithotomy
 URSPL 

 Ureteroscopic pneumatic
 lithotripsy

 VAS-visual analogue scale.

\*Corresponding Author Mufti Mahmood Ahmed **Objective** To compare and analyze the therapeutic outcomes of Retroperitoneoscopic Ureterolithotomy (RPUL) and rigid Ureteroscopic Pneumatic Lithotripsy (URSPL) in patients of impacted upper ureteric calculus (>15mm).

**Patients and Methods** During the study period, 60 patients with large upper ureteral stone (>15 mm) were divided into two groups of 30 patients each. Both the groups were comparable with respect to age, sex and stone size. RPUL was performed, and the stone removed in group A. URSPL was conducted using a rigid ureteroscope, and a pneumatic probe for lithotripsy in group B. The patient characteristics, success rate, stone-free rate, operation time, and complications were analyzed prospectively in the two groups.

**Results** The success rates of operation were 93.4% (28/30) in group A and 86.7% (26/30) in group B, but there was no significant difference between two groups (P>0.05). After 4 weeks of follow-up, the stone-free rate after RPUL (100%, 30/30) and URSPL (80%, 24/30) which was statistically different (P =0.038). However, the mean operation time and hospital staying time after surgery in group A were longer than that in group B, and the differences were statistically significant (P<0.05). The difference in complication rates after RPUL (13%, 4/30) and that after URSPL (10%, 3/30), were statistically insignificant. On the basis of VAS and analgesia required, it was observed that the postoperative pain was significantly more in group A(RPUL) as compared to group B(URSPL),p-value <0.05.

**Conclusion** RPUL is a safe and effective treatment technique for large, impacted, upper ureteral stones [15 mm in size]. URSPL is easy and safe, the operation time and hospital stay are significantly lesser, however the success rate and stone free rates are lower compared to RPUL.

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# INTRODUCTION

Urinary calculi affect about 5-15% of population in industrialized countries<sup>1</sup>. Stone diseases typically affect adult men more commonly than women. Ureteral calculi originate from kidneys, and while passing down the ureter, get lodged at different sites<sup>1</sup>. Ureteral stones account for 33-54% of urinary stones. The stones more than 8mm in diameter cannot be discharged smoothly<sup>2</sup>. Signs and symptoms of ureteric calculi include flank pain, fever, chills, dysuria, hematuria, urinary frequency, urgency and malodourous cloudy urine. Some may exhibit chronic symptoms like malaise, fatigue, loss of apetite and generalized weakness. Rarely infection and obstruction have lasted long enough to produce xanthogranulomatous pyelonephritis, characterised by non functioning kidney or a part of it

Confirmation of diagnosis of urolithiasis is often made by X-ray abdomen (KUB). Ultrasonography, intravenous urography (IVU), computed tomography (CT Scan)<sup>3</sup>.

Optimal treatment strategy for ureteral calculi remains to be determined. The American Urological Association (AUA)/European Association of Urology (EUA) published the 2007 guidelines for management of upper ureteric stones according to stone size and Location <sup>4</sup>.Still certain issues remain controversial and the best choice of treatment for proximal ureteral stone should be left to the practicing physician. In our study, we prospectively evaluated and compared the safety and effectiveness of retroperitoneal laparoscopic ureterolithotomy( RPUL) and ureteroscopic pneumatic lithotripsy (URSPL) for the treatment of proximal ureteral stones larger than 15 mm.

### **Patients and methods**

From January 2013 to October 2014, 60 patients with upper ureteral stones who were selectred on OPD basis in our hospital were considered for this study. Of them, 38 were men and 22 were women. Our inclusion criterion was patients with a single upper ureteral stone(15 mm in diameter), below the ureteropelvic junction to the superior aspect of sacroiliac joint, revealed on plain abdominal film or intravenous urography. Patients with a history of any intervention on the corresponding ureter, active infection, or urinary tract abnormalities, coagulopathy, pregnancy, as well as those requiring simultaneous treatment of their kidney stone, were excluded from our study. These patients were divided into two groups. Group A and Group B consisted of 30 patients each. The patients in group A received RPUL, while URSPL were conducted on patients in group B. The completion of procedure without a need to convert was considered as successful proceedure, and complete clearence of all fragments in the follow up period of six weeks was considered stone free.

All selected patients agreed to enter this study, and the study was approved by the Ethical committee.

#### **Operative Technique-Retroperitoneal Laparoscopic Ureterolithotomy**

After induction of anesthesia to the patient, the patient was placed in lateral decubitus position on the operating table. At a point midway between subcostal margin and iliac crest along midaxillary line a skin incision was made and the aponeurosis bluntly perforated under safe control of both hands. The peritoneum was pushed forward using an index finger, and an indigenous balloon dilator was introduced into the space to create a working space in the retroperitoneal space. After blunt dissection of the retroperitoneal space the dissection balloon was removed. Under the direction of index finger, two more ports were made. One in infra-lumbar region and one mid way between first port and renal angle.Both ports being at 45<sup>0</sup> angle in relation to the first port. Pneumoretroperitoneum was created using C02. Important landmark in the retroperitoneum i.e. the psoas muscle was identified. Gerota's fascia was incised parallel to the psoas muscle and the pulsations of the renal vessels were observed. After removal of the extra peritoneal adipose tissue the ureter was recognized on the psoas muscle. The ureter was dissected to trace the stone location, which could be easily identified by its conspicuous bulge. The ureter wall was incised longitudinally over the bulging stone using an endo-knife. The stone was extracted and removed. An indwelling double-j ureteric stent was placed through the port in selected cases as per requirement. The ureterotomy was closed using absorbable sutures. A suction drain was placed in the retroperitoneal space for about two to three days, and Foley's catheter was retained for a few days postoperatively. The ureteral stent was removed three to four weeks after operation.

#### **Operative Technique Ureteroscopic Pneumatic Lithotripsy**

Under spinal or general anesthesia with the patient in lithotomy position, ureteroscopy was conducted using a 8-9.8F rigid/semi rigid ureteroscope. Access to the ureter will be made by retrograde insertion of a 0.038-in. floppy tip guide wire alongside of which the ureteroscope was introduced. The stone was fragmented using a pneumatic lithoclast. A double-J stunt was placed in selected cases as per the need and removed on an outpatient basis. A Foley catheter was placed for two to three days. Plain abdominal X-ray and abdomenopelvic ultrasound scans was obtained four weeks after the procedure. The presence of stone fragment smaller than 3mm in diameter in the follow up period was considered as successful fragmentation, and complete removal of all fragments was considered stone free.

### Results

None of the patients withdrew from the study. No statistically significant difference was found between the two groups in patient age, sex, stone size, or location (P>0.05; Table 1). The success rate of group A (93.4%) was higher than that of group B (86.7%), but there were no significant differences between group A and B (P = 0.067; Table 2). The operation time and hospital staying time after surgery in group A was longer than those in group B, and there were significant differences between them (P<0.05). The stone-free rates in group A and B were 100 and 80%,

respectively. When the data from group A were compared with group B, the differences were statistically significant (P = 0.0387). In group A, four complications occurred, including intaoperative bleed, abdominal distention caused by peritoneal rupture, and urine leakage. In group B, the dominant postoperative complications were prolonged hematuria and urosepsis. The rate of complications was 13.3 and 10%. There were no differences between the two groups (P = 0.494).the postoperative pain as assessed by VAS and analgesia requirement were significantly higher in group A as compared to group B.

### Discussion

Ureteric stone disease is known since eternity, even in the era of modern medicine, urinary stones continue to be 1 of the major diseases encountered in urologists daily practice.Long term large upper ureteral stones may cause interruption of urinary flow and progressive backpressure on the ureter and kidneys, resulting in hydroureteronephrosis. Raboy et al. [5] performed the first laparoscopic ureterolithotomy and achieved satisfactory results since 1992. Most laparoscopic ureterolithotomies were reported as being performed with a transperitoneal approach, which carried the risk of bowel injury [6]. Retroperitoneal approach reduces the interference of the abdominal cavity and avoids the risk of abdominal organ damage [7]. With this significant progress and outcomes evidenced in clinical practice, the American Urological Association (AUA)/European Association of Urology (EAU) published the 2007 Guidelines for the Management of Ureteral Calculi, and produced practice recommendations for managing ureteral calculi according to different stone sizes and locations[8] However, certain issues remain controversial, such as the best choice of treatment for proximal ureteral stones.

The purpose of the present study was to compare and analyse merits and demerits of Retroperitoneal laparoscopic ureterolithotomy (RPUL) and Ureteroscopic pneumatic lithotripsy (URSPL) in the management of impacted upper ureteric calculus (>15 mm).

The present study included a total of 60,medically fit patients, with impacted upper ureteric calculus(>15 mm), selected on OPD basis and randomised into two groups. The groups being Group A and Group B. The patients belonging to Group A were subjected to Retroperitoneal Laparoscopic Ureterolithotomy (RPUL) and those in Group B underwent Ureteroscopic Pneumatic Lithotripsy (URSPL). Patients in both the groups were comparable with respect to distribution of age, sex, mean stone size, stone side TABLE-1.

The results, on basis of, mean operative time, hospital stay(in days), success rate, stone free rate, complications and post-operative pain were analysed statistically TABLE-2. The mean operative time in group A and B was calculated to be **100.26** minutes and **50.16**minutes respectively. The difference was found to be statistically significant. The reason for difference in mean operative time between the two groups was mainly due to RPUL being more invasive procedure as compared to URSPL; thereby placement of ports and creating a retroperitoneal space in this procedure is time consuming. Moreover this being our early experience with laparoscopic ureterolithotomy was another reason for longer operative time in RPUL (group A). The mean hospital stay in days in two groups was observed to be **4.67** days and **2.3** days in group A and B respectively. The difference was statistically significant. The reason for longer hospital stay in RPUL group was quite obvious, as the procedure involves retroperitoneal dissection, placement of drain in this space in postoperative period, thereby leading to a longer hospital stay. The success rate of the two groups was found to be **93.4%** 

PARAMETERS	<b>GROUP A (RPUL)</b>	<b>GROUP B (URSPL)</b>
No. of patients	30	30
Type of anesthesia	GA	GA
DJ stenting	ALL	ALL
Mean age (in years)	31.4	32.9
Average stone size (in mm)	17.67	17.15
Sex ratio male/female	21/9	17/13
Stone side right/left	18/12	16/14

Table No.1

Table No.2

Parameters	Group a (rpul)	Group b (urspl)	p value
Operative time (in min)	100.26	50.16	0.00004
Hospital stay (in days)	4.67	2.3	0.009
Success rate ( %age)	93.4	86.7	0.62
Stone free rate (%age)	100	80	0.0387
Complication rate (%age)	13.3	10	0.494
analgesia required (mean dose in mg)	Tramadol(121) Diclofenac(112)	Tramazac( 35) Diclofenac(92)	0.00001 0.0316

(RPUL group) as compared to 86.7% (26/30) in case of group B (URSPL group) (28/30) in case of group A respectively. Two patients in RPUL group were converted to open due to bleed which could not be controlled laparoscopically. There were four failed cases in URSPL group, due to proximal migration of the stone into calves, which could not be dealt with by rigid ureteroscope. These were subsequently posted for PCNL(percutaneous nephrolithotomy). The difference was found to be statistically insignificant. Therefore, the success rate in both the groups was comparable. The stone free rates in postoperative and follow up period were found to be 100% (30/30) in case of group A (RPUL) and only 80% (24/30) in case of group B(URSPL). The difference was statistically significant. The stone free rates in RPUL were higher, due to stone being taken out in toto, whereas in URSPL, stone is identified and broken down using pneumatic lithotripter and then larger fragments retrieved using a forcep, leaving a chance of few significant fragments being left over. The complication rate (both intraoperative and postoperative) were found out to be 13.3% (4/30) in group A (RPUL) and 10% (3/30) in group B (URSPL). The difference was statistically insignificant. In Group A (RPUL group) two patients had uncontrolled intra-operative bleed, which warranted conversion to open ureterolithotomy. One patient developed abdominal distension in postoperative period (due to gas leak into peritoneal cavity). One patient developed post-operative urine leak (from ureterotomy site). Both patients were managed conservatively and recovered completely. In Group B (URSPL group) two patients developed urosepsis in post-operative period and one patient developed prolonged haematuria. All patients were managed conservatively.

The severity of pain based on visual analogue scale (VAS) was found to be significantly greater in group A (RPUL) as compared to group B (URSPL). The post-operative analgesia requirement (in form of injectable and oral analgesics) was calculated. The mean analgesic requirement in Group A (RPUL group) was found to be significantly more as compared to Group B (URSPL group). The postoperative analgesia required was understandably high in RPUL group because of retroperitoneal dissection involed in the procedure and thereof longer hospital stay in this group. The complications in both the groups were managed conservatively.Morever,there were no procedure related adverse effects or mortality in either group.

# **Conflict of interests**

There was no conflict of interests.

# Conclusions

In conclusion, Retroperitoneal Ureterolithotomy (RPUL) is a safe and effective method for the management of upper ureteral stones (>15 mm). RPUL removes the stone once thoroughly.Ureteroscopic Pneumatic Lithotripsy (URSPL) is easy and safe, the operation time and hospital stay are significantly lesser, however the success rate and stone free rates are lower as compared to RPUL.

### References

- 1. Gettman MT, Segura JW. Management of ureteric stones: issues and controversies. Br J Urol 2005; 95: 85-93.
- 2. Anagnostou T, Tolley D. Management of uretic stones. Eur Urology June 2004; Vol. 45; Issue 6: pages 714-721.
- 3. Haddad MC, Sharief HS MS et al. Renal colic; diagnosis and outcome. Radiology 1992; 184; 83-88.s
- 4. Preminger GM, Tiselius HG, Assimos DG et al. Guidelines for the management of ureteral calculi. J Urol 2007; 178: 2418-34.
- 5. Raboy A, Ferzli GS, Lofreda R et al (1992) Laparoscopic ureterolithotomy. Urology 39:225–233.
- 6. Feyaerts A, Rietbergen J, Navarra S et al (2001) Laparoscopic ureterolithotomy for ureteral calculi. Eur Urol 40: 609–613.
- 7. Demirci D, Gu<sup>°</sup>lmez I, Ekmekc iog<sup>°</sup>lu O et al (2004) Retroperitoneoscopic ureterolithotomy for the treatment of ureteral calculi. Urol Int 73:234–237
- 8. Preminger GM, Tiselius HG, Assimos DG et al. Guidelines for the management of ureteral calculi. J Urol 2007; 178: 2418-34.